COMPACTRON
Dissimilar Double-Triode Pentode

- COLOR TV TYPE
- VERTICAL OUTPUT PENTODE
- MULTI-FUNCTION
- 10 WATTS PLATE DISSIPATION
- VERTICAL OSCILLATOR
- SYNC CLIPPER

The 6AK9 is a multifunction compactron containing two dissimilar triodes and a beam pentode. The pentode section is suitable for vertical-deflection amplifier service in medium-sized color television receivers. Triode Section 2 (pins 2, 3 and 7) has an amplification factor of 20 and is especially suited for vertical oscillator use. Triode Section 1 has an amplification factor of 43 and is well suited for sync-clipper applications.

GENERAL

ELECTRICAL

Cathode - Coated Unipotential
Heater Characteristics and Ratings
Heater Voltage, AC or DC*. . . . 6.3±0.6 Volts
Heater Current† . . . . . . . . . . . 1.6 Amperes
Direct Interelectrode Capacitances§

Triode (Section 1)
Grid to Plate: (T1g to T1p) . . . . 3.2 pf
Input: T1g to (h + k + Pb.p.) . . . . 3.2 pf
Output: Tp to (h + k + Pb.p.) . . . . 0.56 pf

Triode (Section 2)
Grid to Plate: (T2g to T2p) . . . . 3.6 pf
Input: T2g to (h + k + Pb.p.) . . . . 2.2 pf
Output: T2p to (h + k + Pb.p.) . . . . 0.6 pf

Pentode Section
Grid-Number 1 to Plate: (P1g to Pp) . 0.22 pf
Input: P1g to (h + k + Pg2 + Pb.p.) . 12 pf
Output: Pp to (h + k + Pg2 + Pb.p.) . 8.0 pf

MECHANICAL

Operating Position - Any
Envelope - T-12, Glass
Base - E12-74, Button 12-Pin
Outline Drawing - EIA 12-56
Maximum Diameter . . . . . . . . . . . 1.563 Inches
Minimum Diameter . . . . . . . . . . . 1.437 Inches
Maximum Over-all Length . . . . . 2.875 Inches
Maximum Seated Height . . . . . . . . 2.500 Inches
Minimum Seated Height . . . . . . . . 2.250 Inches

PHYSICAL DIMENSIONS

1.563"MAX.
1.437"MIN.

2.875"MAX.
2.500"MAX.
2.250"MIN.

TERMINAL CONNECTIONS

Pin 1 - Heater
Pin 2 - Triode Plate (Section 2)
Pin 3 - Triode Grid (Section 2)
Pin 4 - No Connection
Pin 5 - Pentode Plate
Pin 6 - Internal Connection - Do Not Use
Pin 7 - Cathode and Pentode Beam Plates
Pin 8 - Pentode Grid Number 1
Pin 9 - Pentode Grid Number 2 (Screen)
Pin 10 - Triode Grid (Section 1)
Pin 11 - Triode Plate (Section 1)
Pin 12 - Heater

BASING DIAGRAM

EIA 12GZ

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### Maximum Ratings

**Pentode Section—Vertical Deflection Amplifier Service**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Plate Voltage</td>
<td>350 Volts</td>
</tr>
<tr>
<td>Peak Pulse Plate Voltage</td>
<td>2500 Volts</td>
</tr>
<tr>
<td>Screen Voltage</td>
<td>250 Volts</td>
</tr>
<tr>
<td>Peak Negative Grid-Number 1 Voltage</td>
<td>150 Volts</td>
</tr>
<tr>
<td>Plate Dissipation</td>
<td>10 Watts</td>
</tr>
<tr>
<td>Screen Dissipation</td>
<td>2.0 Watts</td>
</tr>
<tr>
<td>Total DC Plate and Screen Current</td>
<td>80 Milliamperes</td>
</tr>
<tr>
<td>Total Peak Plate and Screen Current</td>
<td>245 Milliamperes</td>
</tr>
</tbody>
</table>

**Heater-Cathode Voltage**

- **Heater Positive with Respect to Cathode**
  - DC Component: 100 Volts
  - Total DC and Peak: 200 Volts
- **Heater Negative with Respect to Cathode**
  - Total DC and Peak: 200 Volts

**Triode (Section 1)**

- **Plate Voltage**: 330 Volts
- **Positive DC Grid Voltage**: 0 Volts
- **Plate Dissipation**: 1.25 Watts

**Heater-Cathode Voltage**

- **Heater Positive with Respect to Cathode**
  - DC Component: 100 Volts
  - Total DC and Peak: 200 Volts
- **Heater Negative with Respect to Cathode**
  - Total DC and Peak: 200 Volts

**Grid-Circuit Resistance**

- With Fixed Bias: 0.5 Megohms
- With Degenerative Bias: 2.2 Megohms

**Triode (Section 2)—Vertical Oscillator Service**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Plate Voltage</td>
<td>330 Volts</td>
</tr>
<tr>
<td>Peak Negative Grid Voltage</td>
<td>400 Volts</td>
</tr>
<tr>
<td>Plate Dissipation</td>
<td>1.0 Watts</td>
</tr>
<tr>
<td>DC Plate Current</td>
<td>20 Milliamperes</td>
</tr>
<tr>
<td>Peak Plate Current</td>
<td>70 Milliamperes</td>
</tr>
</tbody>
</table>

**Heater-Cathode Voltage**

- **Heater Positive with Respect to Cathode**
  - DC Component: 100 Volts
  - Total DC and Peak: 200 Volts
- **Heater Negative with Respect to Cathode**
  - Total DC and Peak: 200 Volts

**Grid-Circuit Resistance**

- With Fixed Bias: 1.0 Megohms
- With Degenerative Bias: 2.2 Megohms

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Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.
CHARACTERISTICS AND TYPICAL OPERATION

AVERAGE CHARACTERISTICS

Pentode Section
Plate Voltage .......................................................... 60  Volts
Screen Voltage .......................................................... 125  Volts
Grid-Number 1 Voltage .............................................. 0†  Volts
Plate Resistance, approximate ................................... 16400  Ohms
Transconductance ....................................................... 6200  Micromhos
Plate Current .......................................................... 140  Milliamperes
Screen Current ......................................................... 49  Milliamperes
Grid-Number 1 Voltage, approximate                    3.5  Milliamperes
Ib = 100 Microamperes ................................................ 18  Volts

Triode (Section 1)
Plate Voltage .......................................................... 150  Volts
Grid Voltage ........................................................... 11000  Ohms
Amplification Factor .................................................. 43  Volts
Plate Resistance, approximate ................................... 3900  Micromhos
Transconductance ....................................................... 5.4  Milliamperes
Plate Current .......................................................... 3900  Ohms
Grid Voltage, approximate                              5.4  Milliamperes
Ib = 10 Microamperes .................................................-5.7  Volts

Triode (Section 2)
Plate Voltage .......................................................... 150  Volts
Grid Voltage ........................................................... 8500  Ohms
Amplification Factor .................................................. 20  Volts
Plate Resistance, approximate ................................... 2350  Micromhos
Transconductance ....................................................... 5.5  Milliamperes
Plate Current .......................................................... 5.5  Milliamperes
Grid Voltage, approximate                              -11  Volts
Ib = 10 Microamperes .................................................-11  Volts

NOTES

* The equipment designer should design the equipment so that heater voltage is centered at the specified hogey value, with heater supply variations restricted to maintain heater voltage within the specified tolerance.

† Heater current of a hogey tube at Ef = 6.3 volts.

§ Without external shield.

# For operation in a 525-line, 30-frame television system as described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission. The duty cycle of the voltage pulse must not exceed 15 percent of one scanning cycle.

Δ Degenerative bias is defined as bias derived wholly from a cathode resistor or any feedback system which achieves an equivalent reduction in gain.

€ Applied for short interval (two seconds maximum) so as not to damage tube.
AVERAGE PLATE CHARACTERISTICS

PENTODE SECTION

$E_1 = \text{RATED VALUE}$
$E_{c1} = 0 \text{ VOLTS}$
$E_{c2} = 150 \text{ VOLTS}$

PLATE CURRENT ($I_0$) IN MILLIAMPERES

SCREEN CURRENT ($I_{c2}$) IN MILLIAMPERES

PLATE VOLTAGE IN VOLTS

AUGUST 21, 1967